Status and distribution of the Ashy Storm-Petrel *(Oceanodromahomochroa)* at Point Reyes National Seashore, California, in 2001

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Chimney Rock; 2) Bird Rock near the mouth of Tomales Bay; 3) offshore rocks between Double Point and Point Resistance; 4) the coast between the Golden Gate Bridge and Point Bonita; and 5) Steep Ravine near Rocky Point. The first three areas are managed by the PRNS, while the latter two areas are managed by the Golden Gate National Recreation Area (GGNRA) and/or Mount Tamalpais State Park (MTSP). Coastal habitats in these areas are characterized by steep, rocky cliffs and slopes with numerous caves and offshore rocks which provide potential nesting habitat for petrels.

Methods

We scheduled our 2001 surveys for periods within a few days of the new moon (16-23 August and 10-14 September) when nights were darkest because petrel activity at colonies is reduced and mist-netting efforts are less effective on moon-lit nights (Ainley et al. 1990). Work completed in 2001 included: 1) daytime nest searches in sea caves along the Point Reyes Headlands and nighttime mist net captures and nest searches at Chimney Rock on 22-23 August; 2) mist net captures and nest searches at Bird Rock on 10-11 September; 3) habitat evaluation and nest searches on offshore rocks between Point Resistance and Double Point on 12 September; 4) habitat evaluation and nest searches in mainland sea caves along the GGNRA on 14 September; and 5) broadcasting of recorded tape lures and a habitat evaluation along the mainland shore and offshore rocks at Steep Ravine on 22 September and 4 October. Mist-netting efforts on the mainland shore just off Chimney Rock were attempted on 20-21 August, but high winds throughout the night prevented captures and at one point collapsed the mist net. Additional survey efforts were planned in 2001, specifically multiple night mist-netting efforts on Bird Rock, Chimney Rock, and Stormy Stack, but consistent strong winds and rough seas limited efforts to single nights at Bird and Chimney Rock.

Mist-Netting: The mist net site at Chimney Rock was set up near the top of a low saddle on the north side of the rock toward the west end. The mist net site at Bird Rock was located on a broad ledge on the northeast side of the rock, just outside several crevices where a mist net was set up and petrel nests were found in 1989 (Fig. 2 a-b). We deployed a single 2.1 x 5.5 m four tier mist net mounted on alloy metal poles at each site. Storm-petrel vocalizations (predominately Ashy Storm-petrel but also Leach's Storm-petrel *[Oceanodroma leucorhoa]* at Bird Rock) were broadcast from portable cassette players placed under the mist net to attract birds to the site. Captured petrels were banded with U.S. Fish and Wildlife Service #1 incoloy leg bands. For each bird, we examined and scored the development of the single medial brood patch (Ainley et al. 1974) and inspected and scored the primary, rectrix and body molt condition (Carter et al. 1992). We also measured several morphometric characters, including wing, tail, culmen, and tarsus lengths, and body mass.

Habitat Evaluation and Nest Searches: We used an inflatable boat powered with a 15 HP outboard engine for transport to and from all sites except Rocky Point which was accessed on foot. We evaluated each offshore rock or sea cave from the inflatable boat to determine if suitable petrel breeding habitat was present and whether or not a safe landing spot was available.

that both were actively breeding or had attempted to breed in 2001 (Table 1). We observed three other petrels flying around the net which were not captured (although they may have been captured previously or later that night). We searched the numerous crevices (six small, 13 medium, and five large crevices) on the ledge wall in back of the mist net site where several nests were discovered in 1989, but no active nests were detected in 2001 and no petrel odor was noted within the crevices. Large numbers of roosting cormorants and pelicans prevented searches on the south side of the rock, but searches along the east and west sides of the rock failed to discover any active petrel nests or evidence of recent nesting. Although we captured only two petrels at Bird Rock and found no active nests, based on the few captures and available habitat we estimated 5-10 breeding pairs in 2001 (Table 2).

Our 2001 estimate for Bird Rock is markedly lower than the 1989 estimate of 47 breeding pairs (Carter et al. 1992; Table 2) based on two nights of capture and nest search efforts (Table 1). On the night of 6-7 August 1989, forty petrels were captured and three nests were observed. Two nests (one unattended chick and two adults attending an egg) on the north side and one nest (unattended chick) on the south side of Bird Rock. All but two of the captured petrels had bare (n = 14) or refeathering (n = 24) brood patches (Table 1). A few weeks later on the night of 31 August-I September, twenty petrels were captured (12 recaptures and eight new captures) and six nests (all with chicks) were found in crevices on the north side of the rock. All twenty petrels captured during the latter effort had bare (n = 2) or refeathering (n = 18) incubation patches (Table 1).

Offshore Rocks between Point Resistance and Double Point: We evaluated five offshore rocks between Point Resistance and Double Point which were considered large enough to harbor potential petrel breeding sites including; Point Resistance Rock, North and South Millers Point Rocks, Double Point Rock, and Stormy Stack (Fig. 1). After visual inspection from the inflatable boat, we determined that the first four rocks contained little or no accessible breeding habitat and no further searches were conducted. While some accessible shallow crevices were present on all the rocks, it appeared from the boat that they were too shallow to serve as potential nest sites. Marginal crevice habitat was present on Millers Point South Rock and Double Point Rock, but crevices were located on steep rock faces which were not accessible without climbing gear. In contrast, there were numerous deep crevices on the accessible north side of Stormy Stack which we felt warranted further investigation.

Nest searches on Stormy Stack yielded four nests, two active nests with what appeared to be unattended chicks, one active nest with an incubating adult, and one apparently abandoned egg. Three of the nests were found in crevices within a deep fissure running up the steep northwest side of the rock (Fig. 3 a-b). This fissure contained numerous inaccessible crevice sites which could have harbored several undetected nests. We attempted to collect the abandoned egg, but it was too deep within the crevice to retrieve. On the basis of nest searches and an evaluation of the available habitat, we tentatively estimated 20-40 breeding pairs nesting on Stormy Stack. Mist netting captures would have helped refine our estimate, but a planned capture attempt at Stormy Stack on the night of 13 September was cancelled as rough seas encountered en route to

sites. It is possible that small petrel colonies are established in suitable habitats along the central California coast by petrels emigrating from the large Farallon Islands colony, but recent declines there make this unlikely (Sydeman et al. 1998). However, it is also possible that small petrel colonies in the PRNS are self-sustaining, but limited by the amount of nesting habitat available.

The discoveries of small petrel colonies scattered widely around central California is certainly a positive signal for the future of this vulnerable species, as a wider breeding distribution lessens the threat of a localized catastrophe extirpating the entire population. However, the recently discovered colonies in the PRNS and at Castle/Hurricane Rocks are all small and it is likely that less than a few hundred petrels breed along the central mainland California coast in Marin, San Francisco, San Mateo, Santa Cruz, Monterey and San Luis Obispo counties, although few rocks and mainland cliffs have been examined in **this** area (McChesney et al. 2000). For example, much suitable habitat exists on San Pedro Rock where petrel odor has been noted on several occasions between 1998 and 2002 (M. Parker and H. Carter, unpubl. data). Coastal areas at Steep Ravine and Double Point appear to contain suitable petrel breeding habitat for small numbers and warrant further survey efforts, but caves in the GGNRA appear unsuitable as petrel breeding habitat.

POPULATION TRENDS AT BIRD ROCK

Apparent population declines observed at the South Farallon Islands (Sydeman et al. 1998) and Bird Rock are alarming. These are the only colonies in central California with any data concerning petrel population trends, and, since both indicate decreasing populations, may indicate losses throughout the region. With scant available data, it is difficult to speculate about the cause of the apparent decline at Bird Rock between 1989 and 2001. It seems improbable that our survey on 10-11 September was conducted after most or all nesting attempts were completed at Bird Rock, as we observed chicks and incubating adults in nests at Stormy Stack just a few days later and September is the main chick-rearing period at the South Farallon Islands with most fledging in late September, October and early November (Ainley et al. 1990, Ainley 1995). Thus, considering the small captured sample and the lack of evidence of active nests and petrel odor from visible crevices, there is strong evidence large declines have occurred. In fact, our assessment of 5-10 breeding **pairs** may be an overestimate given the past history of the rock and the considerable nesting habitat available. Instead, it is possible that the few birds captured here are visitors from other colonies and that breeding no longer occurs at Bird Rock.

We have insufficient data to determine if the factors responsible for the suspected declines **or** possible extirpation of the petrel colony at Bird Rock reflect large scale regional problems (e.g., oil pollution, chemical pollution, reduced prey resources). If regional threats were having significant impacts in the region, the detrimental effects should be expressed at Point Reyes, the South Farallon Islands (just 35 **km** south of Point Reyes), and other colonies in central California whose birds probably share similar foraging habitats. However, population declines at the South Farallon Islands have been primarily attributed to increased predation by Western Gulls (*Larus occidentalis*) and owls and not any specific large scale at-sea threats (Sydeman et al. 1998),

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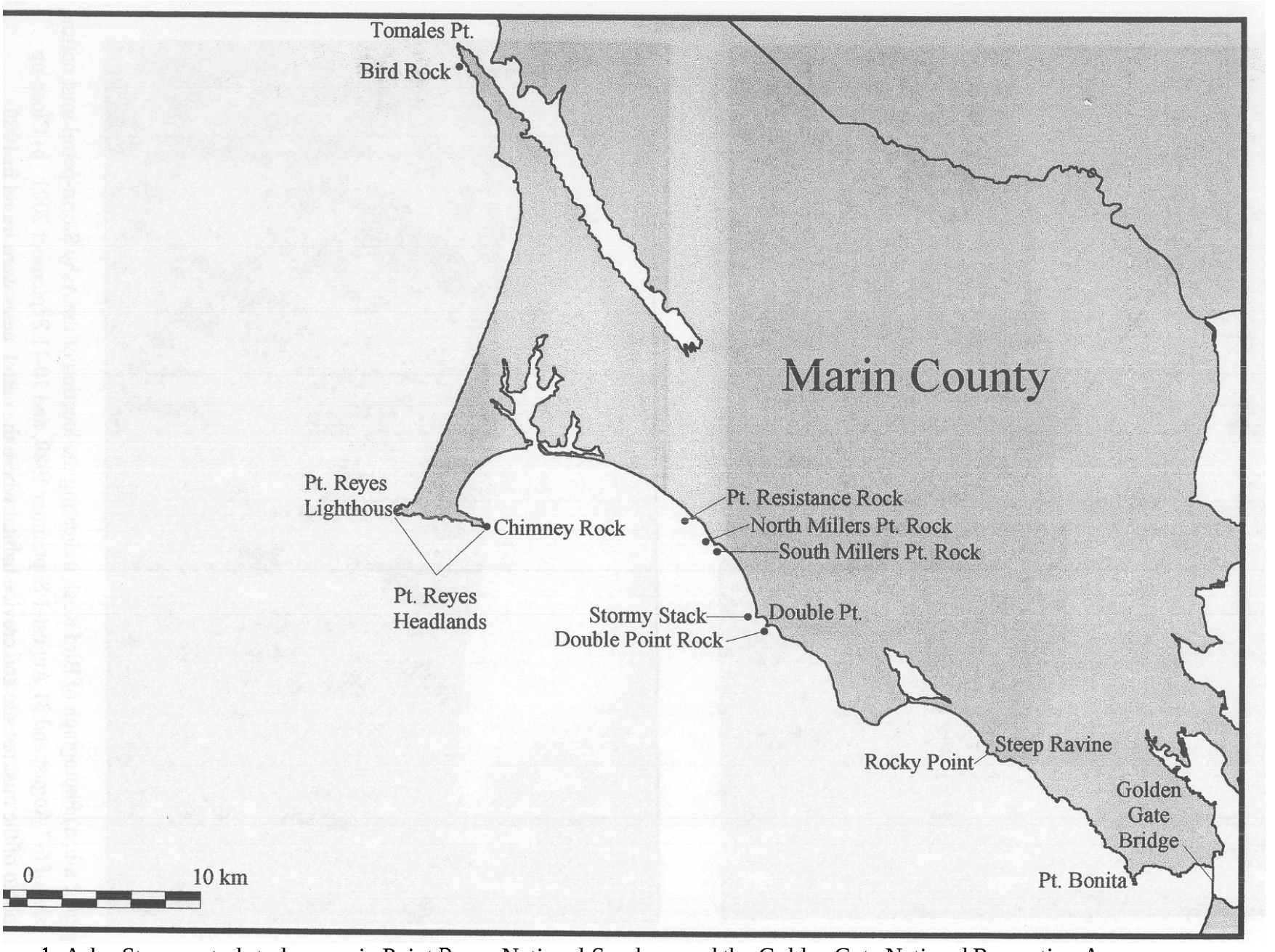
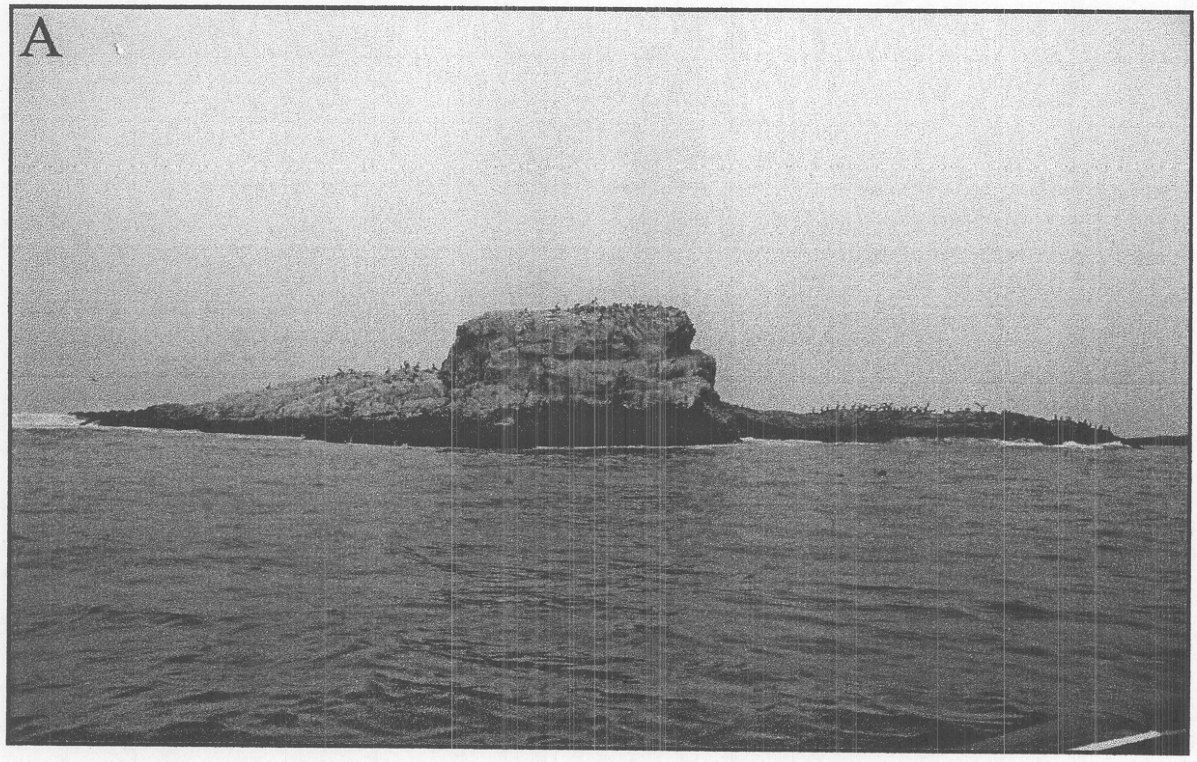


Figure 1. Ashy Storm-petrel study areas in Point Reyes National Seashore and the Golden Gate National Recreation Area



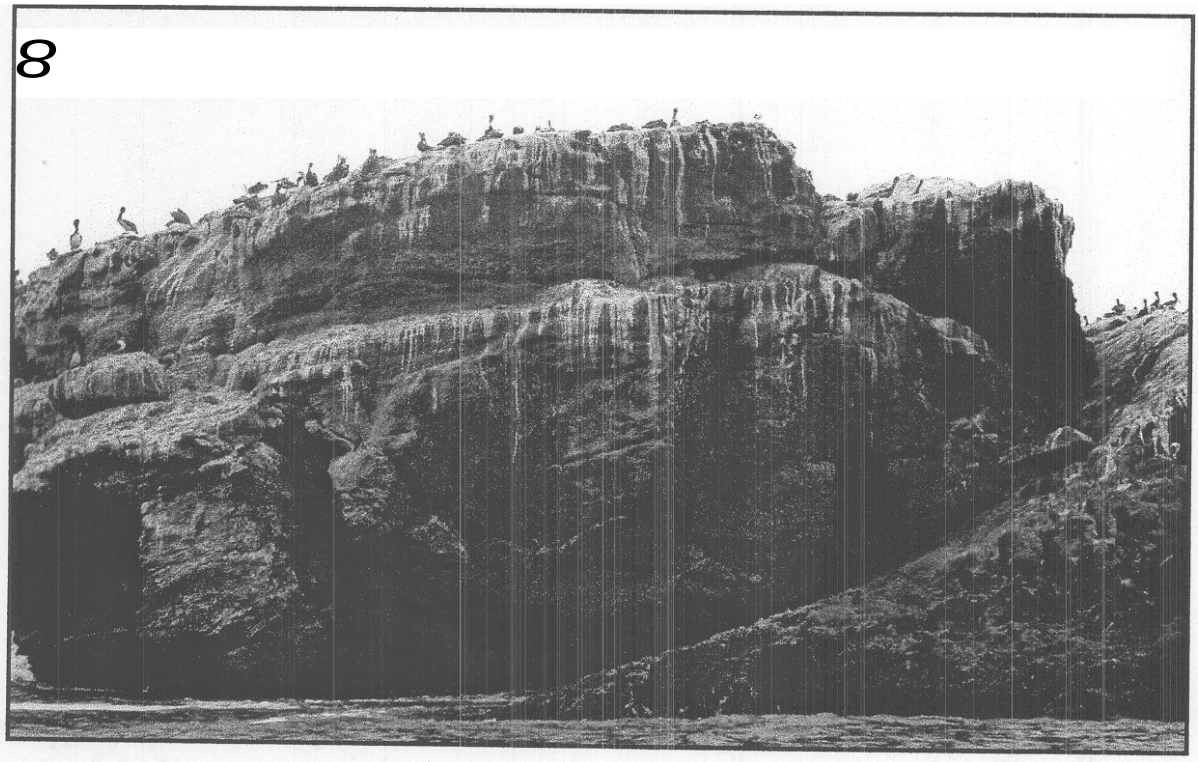


Figure 3 a-b: a) Photograph of the north side of Stormy Stack illustrating the location of three Ashy Storm-petrel nests found during surveys on 12 September 2001. b) Close-up photo of the crevice habitat where three petrel nests were found. Photographs by D.L. Whitworth, 12 September 2001.